

may not be necessary when universal joints are used between the spindle and the bar.

Jigs for Multiple Boring. — As a rule but one hole is bored out at a time, owing to the fact that machines for boring generally have but one spindle. Several holes, however, could be bored out in a large-size multiple-spindle drill, in which case the jigs naturally ought to be designed somewhat stronger. Another method of designing jigs for boring two or more holes

**Fig. 7. Jig for Boring** Holes through Work both from Sides and Ends

at the same time is illustrated in Fig. 6, the\* outlines only being shown in this illustration. The gearbox  $\text{I}!$  contains the main driving gear which is mounted on a shaft  $K$  which, in turn, is driven by the spindle of the machine. The gear on shaft  $B$  drives the gears and shafts connected

with the boring bars passing through the bushings (\ />, f, /\*\ (, and //). The gears are proportioned according to the speed required for each bar, which in turn is determined by the sizes of the holes. The housing or gear-box A slides on a dovetail slide A'''. A particularly good fit should be provided, and the gear-box can be fed along in relation to the work either by table or spindle feed. If